



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

# SCIENCE

A WEEKLY JOURNAL DEVOTED TO THE ADVANCEMENT OF SCIENCE, PUBLISHING THE  
OFFICIAL NOTICES AND PROCEEDINGS OF THE AMERICAN ASSOCIATION  
FOR THE ADVANCEMENT OF SCIENCE.

EDITORIAL COMMITTEE : S. NEWCOMB, Mathematics ; R. S. WOODWARD, Mechanics ; E. C. PICKERING  
Astronomy ; T. C. MENDENHALL, Physics ; IRA REMSEN, Chemistry ; CHARLES D. WALCOTT,  
Geology ; W. M. DAVIS, Physiography ; HENRY F. OSBORN, Paleontology ; W. K.  
BROOKS, C. HART MERRIAM, Zoology ; S. H. SCUDDER, Entomology ; C. E.  
BESSEY, N. L. BRITTON, Botany ; C. S. MINOT, Embryology, Histology ;  
H. P. BOWDITCH, Physiology ; WILLIAM H. WELCH,  
Pathology ; J. McKEEN CATTELL, Psychology.

FRIDAY, DECEMBER 11, 1903.

## CONTENTS:

<i>University Registration Statistics:</i> DR. RUDOLF TOMBO, JR.....	737
<i>Variations induced in Larval, Pupal and Imaginal States of Bombyx mori by Controlled, Varying Food Supply:</i> PROFESSOR V. L. KELLOGG and R. G. BELL.....	741
<i>Scientific Books:—</i>	
<i>Recent Psychological Literature:</i> PROFESSOR JAMES ROWLAND ANGELL.....	748
<i>Scientific Journals and Articles.....</i>	751
<i>Societies and Academies:—</i>	
<i>The Convocation Week Meetings of Scientific Societies. The Academy of Science of St. Louis:</i> PROFESSOR WILLIAM TRELEASE. <i>New York Section of the American Chemical Society:</i> DR. H. C. SHERMAN. <i>Torrey Botanical Club:</i> DR. F. S. EARLE. <i>The Science Club of the University of Wisconsin:</i> VICTOR LENHER.....	751
<i>Discussion and Correspondence:—</i>	
<i>The Chemistry of Soils as related to Crop Production:</i> PROFESSOR E. W. HILGARD. <i>Absorbed Gases and Vulcanism:</i> ALFRED C. LANE .....	755
<i>Shorter Articles:—</i>	
<i>The Heredity of 'Angora' Coat in Mammals:</i> PROFESSOR W. E. CASTLE. <i>Concerning Mosquito Migrations:</i> PROFESSOR JOHN B. SMITH.....	760
<i>The Congress of Arts and Science of the St. Louis Exposition.....</i>	764
<i>The American Society of Naturalists.....</i>	766
<i>Scientific Notes and News.....</i>	766
<i>University and Educational News.....</i>	768

## UNIVERSITY REGISTRATION STATISTICS.

A COMPARISON of the figures on the table with those for 1902 (SCIENCE, N. S., Vol. XVI., No. 417, December 26, 1902, p. 1022) will show that at the majority of the institutions given in the table the number of students enrolled during the present academic year represents an increase over the registration of last year. Several institutions have suffered a slight decrease in attendance and the general gain is not as marked as it was last year, yet on the whole the figures point to a normal and healthy growth, and the steady forward movement in the progress of higher education has continued virtually unchecked. Undoubtedly the present economic conditions of the country are partially accountable for this slight falling off in the percentage of general increase, but the effect, if any, can scarcely be regarded as serious, and would, in the ordinary course of events, not be felt keenly until next year.

The statistics given on page 738 are, with few exceptions, approximately as of November 1, 1903, and relate to the registration at twenty of the leading universities throughout the country. In order to avoid all misapprehension, it should be distinctly understood that the higher institutions of learning here represented are not necessarily the twenty largest or the twenty leading universities, but all are in-

	California.	Chicago.	Columbia.	Cornell.	Harvard.	Illinois.	Indiana.	Johns Hopkins	Leland Stanford, Jr.	Michigan.	Minnesota.	Missouri.	Nebraska.	Northwestern.	Ohio State.	Pennsylvania.	Princeton.	Syracuse.	Wisconsin.	Yale.
College Arts, Men....	490	569	493		2077	302	923	158	800	742	470	284	330	371	271		732		732	1251
College Arts, Women	913	812	399	} 726	444	305	596	.....	478	635	745	133	608	421	200	} 514			525	.....
Scientific Schools*	840	.....	719		1317	547	797	.....	8	1	524	253	382	.....	720		540	586	264	705
Law.....	80	89	384		734	140	95	.....	198	823	430	180	170	210	159	324	.....	125	194	255
Medicine.....	118	147	669		355	380	669	25	278	448	265	80	59	512	.....	472	.....	140	.....	144
Agriculture.....	†	.....	.....		135	19	285	.....	.....	700	67	98	.....	.....	151	.....	.....	49	496	.....
Art.....	206	.....	.....		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	33
Dentistry.....	112	.....	.....		115	585	.....	.....	.....	74	140	.....	19	500	.....	363	.....	.....	.....	98
Divinity.....	.....	177	.....		50	.....	.....	.....	.....	.....	.....	.....	.....	150	.....	.....	.....	.....	.....	.....
Forestry.....	.....	.....	.....		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21	.....	.....	.....	.....	64
Music.....	.....	.....	.....		.....	93	.....	.....	.....	.....	.....	.....	320	318	.....	.....	.....	579	227	80
Pharmacy.....	84	.....	.....		.....	183	.....	.....	.....	56	46	.....	.....	217	47	.....	.....	32	.....	.....
Teachers College.....	†	95	624		.....	.....	.....	.....	.....	.....	.....	84	.....	.....	.....	165	.....	.....	.....	.....
Veterinary.....	.....	.....	.....		85	.....	.....	.....	.....	.....	.....	.....	.....	.....	84	75	.....	.....	.....	.....
Graduate Schools.....	207	442	620		177	31	101	1	191	19	1	1	1	1	1	1	116	46	95	346
Summer Session.....	868	2244	1001		470	1392	225	479	.....	18	523	175	639	191	.....	104	.....	52	400	.....
Other Courses.....	32	.....	17		157	72	.....	65	.....	.....	.....	.....	.....	100	85	.....	.....	110	.....	15
Deduct Double Reg..	(290)	(429)	(369)		(219)	(139)	(99)	(577)	(1)	(210)	(245)	(20)	(222)	(18)	(102)	(109)	(26)	(100)	(185)	(141)
Grand Total.....	3690	4146	4557		3438	6013	3661	1614	694	1370	3926	3550	1540	2247	2740	1710	2644	1434	2207	2990
Teaching Staff.....	342	197	585		420	549	399	71	150	128	182	295	106	220	304	140	308	108	180	325

\*Includes schools of engineering, chemistry, architecture, mining, and mechanic arts.

†Included in scientific schools.

‡Included in college statistics.

§Included in college statistics.

stitutions of national repute. The figures have been obtained from the proper officials of the universities concerned, and are as accurate as statistics of this nature can be made. Changes are constantly taking place in the enrolment at most of these institutions, but they are not far-reaching enough to affect the general result.

According to the revised figures of last year, the nineteen universities enumerated ranked as follows:

Harvard, Columbia, Chicago, California, Michigan, Minnesota, Cornell, Illinois, Wisconsin, Northwestern, Yale, Pennsylvania, Nebraska, Syracuse, Indiana, Leland Stanford, Missouri, Princeton, Johns Hopkins. Comparing this with the present order, we shall find that there has been no change in the relative positions of the three largest universities, Harvard, Columbia and Chicago, but that Michigan has passed California, while Illinois has passed both Minnesota and Cornell. Wisconsin occupies the same position as last year, but Yale has passed Northwestern. Pennsylvania, Nebraska and Syracuse follow in the same order, Ohio State University, which is in-

serted for the first time this year, preceding Indiana, Missouri, Princeton, Leland Stanford and Johns Hopkins in the order named. The fact must not be lost sight of that numbers are not necessarily a criterion of general excellence or high standards, features with which this article does not attempt to deal. However, the fact that a university like Johns Hopkins is included in the statistics will prove that mere numbers have not unduly influenced the selection of the institutions here tabulated.

As far as the changes in the enrolment of the different universities are concerned, Harvard shows a considerable net increase, due almost entirely to the expansion of the summer session from 945 in 1902 to 1,392 in 1903. This increase must be attributed in large part to the Convention of the National Educational Association held in Boston early in July. Harvard's law school shows a gain of almost 100, thus eloquently demonstrating that increased standards of admission to the professional schools are not kept waiting long for merited recognition from the student body.

To be sure, the Harvard Medical School shows a loss of 65 as compared with last year, owing in part to the operation since 1901 of the requirement of a baccalaureate degree, or its equivalent, for admission, but we shall see below that this loss in the medical school enrolment may be due to other causes. Harvard College and the Lawrence Scientific School show a slight falling off over last year, while there has been a gain in the divinity school and the graduate faculties.

At Columbia also the increase in the total enrolment is due almost entirely to the growth of the summer session, the attendance at which increased from 643 in 1902 to 1,001 in 1903. The registration of the law school shows a falling off of 81, due to the requirements of the baccalaureate degree for admission for the first time this fall. The attendance at the school of medicine has decreased over 100, a loss that can in large part be attributed to increased standards for admission. With the opening of the present academic year, higher entrance requirements went into effect, whereby the minimum condition for admission to this faculty consists not, as heretofore, in the passing of examinations conducted by the regents of the university of the state in certain specified subjects, and the obtaining thereby of a medical student's certificate, but in the passing of an examination conducted either by the College Entrance Examination Board or by the Committee on Entrance Examinations of Columbia University. In every case the increase in requirements has had a gratifying effect on the quality of the first-year class. The graduate schools of Columbia University are growing very rapidly and show an increase of more than 100 over 1902. The extension students, of which there were 1,196 in 1902, have been omitted in this year's table, but even if the extension students were included, Columbia's

registration would not be as large as that of Harvard.

The figures of the University of Chicago point to a slight decrease in the total enrolment, most of which is due to a falling off in the college and the faculty of medicine. The summer session shows a loss of over 100, but, as is well known, the summer session at the University of Chicago does not bear the same relation to the remaining terms as it does at Harvard or Columbia and most of the other institutions here represented, being regarded as a regular semester fitting into the scheme of the entire year's work.

The attendance at the University of Michigan has increased somewhat over last year, the largest gains being found in the scientific schools and the summer session. The faculties of law, dentistry and pharmacy all show a falling off. Of the 448 medical students, 66 are enrolled in the homeopathic division. In the case of the University of Michigan, as well as of several others, no accurate figures could be obtained for the number of summer session students who returned for work in the fall and who should be deducted under double registration. In all such cases the deduction is based upon a fair estimate.

The increase at the University of California is only slight, there being a loss in medicine and dentistry and in the college and scientific schools, which loss, however, is more than compensated for by slight gains in other departments.

In the case of the University of Illinois the gain of over 700 must be attributed chiefly to the fact that the Chicago College of Dental Surgery, formerly an independent institution, became a part of the university at the beginning of the year. However, there has been considerable gain in the scientific school and the department of agriculture, whereas the increase in the

attendance at the medical school is scarcely worth mentioning.

The increase at the University of Minnesota is small and is to be found almost entirely in the department of agriculture. The slight decrease in the number of male college students is more than made up by the increase of the number of women enrolled in the college. The law school has remained stationary, the scientific schools show an increase, and the medical faculty, the departments of dentistry and pharmacy, the graduate schools and the summer session, show a falling off in attendance.

At Cornell there has been a slight increase in the total attendance, and the typhoid epidemic of last year has apparently not affected the attendance to any great degree. There has been a decrease in the college, the faculty of medicine and the graduate schools. The department of forestry has been abolished and the summer session shows a decrease over last year. In the case of Cornell, also, the total is not quite accurate, inasmuch as no exact figures were given with regard to double registration.

Wisconsin shows considerable gains all along the line, with the exception of the graduate schools and the law faculty, the total enrolment being more than 300 in excess of that of last year.

The attendance at Yale has also increased over last year, the gains appearing in the college, the Sheffield Scientific School and the department of forestry. The medical and the graduate schools have remained stationary, while the law school and the schools of art, music and divinity show a decrease in enrolment.

There has been a decrease in the attendance at Northwestern University, a considerable portion of which is to be found in the faculties of medicine and dentistry. This decrease in attendance at the medical school may be attributed to two causes,

namely, increased tuition and higher standards of admission. The 100 students listed under 'Other Courses' are students in oratory. The college and the law school show an increase, while the graduate schools, the divinity school and the department of pharmacy have remained stationary.

Pennsylvania shows a slight increase in the net total enrolment, due almost entirely to gains in the college and scientific schools. Law and dentistry have fallen off, whereas medicine and the graduate schools have remained stationary. The 165 students appearing under 'Teachers College' are attending courses for teachers.

At the Universities of Nebraska and Indiana there has been a slight decrease; Leland Stanford, Jr., has remained virtually stationary; while Syracuse, Missouri, Princeton and Johns Hopkins show an increase over the attendance of last year.

Comparing the attendance in the various departments with the figures for last year, the most striking fact is the decided decrease in the schools of medicine all along the line. In a number of institutions increased requirements have had something to do with this loss, yet the higher standards of admission alone can not be held accountable. The question arises whether this loss may not be due to a circumstance to which Professor Brouardel, of Paris, points in a recent investigation. He claims that the superabundance of physicians going hand in hand with a shortage of patients must be attributed to a decrease in the number of illnesses, a decrease due to the application of modern methods of preventive medicine.\* The increase in the cost of procuring a medical education no

\* Cf. Walter B. James, 'The Old and the New Medicine,' *Columbia University Quarterly*, Vol. VI., No. 1, p. 13. At McGill University, Montreal, Canada, the enrolment in the medical school also shows a decrease.

doubt is partly responsible, as well as the long time required for a thorough course.

The number of scientific students is still on the increase. In most of the other faculties there have been no consistent gains or losses, the decrease in certain universities being made up by a corresponding increase in others. Columbia University still has the largest enrolment in the graduate schools, with Chicago second, Harvard third and Yale fourth. The University of Michigan continues to head the list in the number of law students, followed by Harvard, Minnesota and Columbia in the order named. Although the attendance at the Columbia medical school has suffered a loss of over 100, this university still has the largest enrolment of any of the medical schools enumerated, but is closely followed by Illinois, with Northwestern and Pennsylvania occupying third and fourth places respectively.\* As to the scientific schools, Cornell is in the lead, with Yale second, California third and Michigan fourth. Harvard has by far the largest collegiate enrolment and also had the largest summer session last year. As to the relative ranking of the teaching force in the largest institutions, Columbia now occupies first place, with Harvard second, Cornell third and Illinois fourth.

RUDOLF TOMBO, JR.,  
Registrar.

COLUMBIA UNIVERSITY.

VARIATIONS INDUCED IN LARVAL, PUPAL  
AND IMAGINAL STAGES OF *BOMBYX*  
*MORI* BY CONTROLLED VARY-  
ING FOOD SUPPLY.

ONE of the races of the mulberry silkworm, *Bombyx mori*, has been the subject

\*The table credits Columbia and Illinois with 669 students each, but in the case of Columbia there are a number of fourth-year college students enrolled in the medical school who do not appear among the 669, but in the primary registration under the college.

of experiments directed toward a determination of the exact quantitative relation which quantity and quality of food bear to the development and variations of the individual insect and its progeny. Such an experiment, on the face of it, might seem to be a laborious task having no further justification than the superfluous, though specific, demonstration of the axiom that the well-nourished are the well-developed. The writers will not hesitate, however, to put on record authentically determined data showing just how definite and constant is the relation for one animal species between varying nutrition and variations. As a matter of fact the experimental breeding and rearing and the accumulation of quantitatively determined data refer to several problems besides the few discussed in this paper. The successive years of breeding have left us at the present moment with a large number, several thousand, of eggs, due to hatch next March, which are the results of selected mating, and of which the ancestors for two or three generations are known, quantitatively described, and preserved for reexamination, if necessary. In addition to the knowledge of the structural and physiological characters (duration of various life-stages, etc.) of these ancestors, the quantitatively determined life-conditions, normal and experimentally varied, are known. These thousands of the fourth generation should afford us exact evidence, for this animal species, touching the prepotency of sex, of sports, of particular characters and of vigor, as well as evidence regarding fertility in relation to age, and evidence concerning genetic and physiological selection.

The present statement is limited to an outline of the results of only those experiments relating directly to the influence exerted by varying conditions of food supply.

The insect, *Bombyx mori*, has a complete metamorphosis, taking no food as an adult,